1) A

Notice, that triangle AED and ABC are similar as line DE is parallel to CB and both triangles share angle A. This means that all the angles are equal to one another. This means that the measure of x will be equivalent to the angle of D. We set up a trig function to find the angle.

$$sinD = \frac{AE}{AD}$$
$$sinD = \frac{12}{20}$$
$$D = sin^{-1}(.6)$$
$$D \approx 36.87°$$

2) D

Sin(A) would be opposite over hypotenuse. In this case, the opposite side would we side length a. Cos(B) would be adjacent over hypotenuse. In this case, the adjacent side of angle B is also a.

3) B

Cos(y) will equal the same as sin(x) since the adjacent side of angle y is the opposite side of angle x. This means that cos(y) will equal sin(x). In choice B, the answer simplifies to sinx, making it the right choice.

$$tanxcosx = \frac{sinx}{cosx} \times cosx$$
$$tanxcosx = sinx$$

4) D

With the information provided, we must use trig functions to find the side lengths of the rectangle. Notice that the diagonal that divides the rectangle creates a right triangle. We use this to solve for our rectangle's dimensions

$$\sin(34°) = \frac{XY}{14}$$
$$0.5592 = \frac{XY}{14}$$
$$7.829 = XY$$

$$\cos(34°) = \frac{ZY}{14}$$
$$0.829 = \frac{ZY}{14}$$
$$11.607 = ZY$$

Now that we know the dimension of the rectangle, we simply find the area.

$$7.289 \times 11.607 \approx 84.6\ in^2$$

5) C

All we need to do is find the length of DC and then multiply that length by two to get our answer since line AD bisects BC. We do this by using trig functions.

$$\tan(45°) = \frac{DC}{12}$$
$$1 = \frac{DC}{12}$$
$$12 = DC$$

So, if DC is 12 units in length, BC is 24 units.

6) A

First, let's find the length of AC. We can use the trig functions to do this by finding the angle of A and then finding AC.

$$\sin A = \frac{8}{16}$$
$$\sin A = 0.5$$
$$A = 30°$$

Now, we use the angle to find AC by taking the cosine of the angle.

$$\cos(30) = \frac{AC}{16}$$
$$0.866\ldots \times 16 = \frac{AC}{16} \times 16$$
$$13.9 \approx AC$$

Now we add the side lengths.

$$16 + 8 + 13.9 = 37.9$$

7) C

First thing to notice is that line EB and AC are parallel, meaning that when the two lines intersect AB and DC respectively, they will have the same angle. With this knowledge, we can find the angle of C by using trigonometry and then find angle A using algebra and the interior angle sum theorem. Notice that triangle ACD has side lengths of 6 and 10.

$$\tan C = \frac{6}{10}$$
$$\tan C = 0.6$$
$$C \approx 30.96$$

If angle C has a measure of roughly 30.96, angle B will also be 30.96 degrees.
Now, we find the missing angle by subtracting the measure of the sum of the known angles by 180.

$$180 - (90 + 30.96) = x$$
$$180 - 120.96 = x$$
$$59° \approx x$$

8) B

Notice that triangle CAB and DEB are similar, meaning that we can find the length of BD using proportions.

$$\frac{4}{6} = \frac{8}{BD}$$
$$BD(4) = 48$$
$$BD = 12$$

From here, we can use trig functions to find the measure of angle B to find the lengths of AB and BE to ultimately find AE.

$$\sin B = \frac{4}{6}$$
$$\sin B = 0.66\ldots$$
$$B \approx 41.81°$$

Now we can find the missing lengths.

$$\cos 41.81 = \frac{AB}{6}$$
$$0.745 = \frac{AB}{6}$$
$$4.5 \approx AB$$
$$\cos 41.81 = \frac{BE}{12}$$
$$0.745 = \frac{BE}{12}$$
$$8.9 \approx BE$$

Now add AB and BE to find AE.

$$4.5 + 8.9 = 13.4$$

9) A

$\cos K$ would be the same as $\sin J$ as the opposite side of J is the adjacent side for K. This means that the value for these trig functions would be the same.

10) C

Sin(x) will always equal cos(90-x). We can see this in a numerical example:

$$\sin x = \frac{5}{12}$$
$$\sin x = 0.4166\ldots$$
$$x = 24.624\ldots$$
$$\cos(90 - 24.624\ldots) = 0.4166\ldots$$